IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	**Case No. 05-cv-329-GKF(PJC)**
	)	
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

DECLARATION OF ROGER L. OLSEN, Ph.D.

I, Roger L. Olsen, Ph.D., hereby declare as follows:

1. Since February 1985, I have been an employee of Camp Dresser & McKee Inc. ("CDM"), an environmental consulting firm. I currently hold the position of Senior Vice President and Senior Geochemist with CDM. My educational background includes a Bachelor of Science degree, with high distinction in Mineral Engineering Chemistry, from the Colorado School of Mines in Golden, Colorado, in 1972 and a Doctor of Philosophy degree in Geochemistry from the Colorado School of Mines in 1979.

2. From 1975 to 1978, I was an instructor in chemistry and geochemistry at the Colorado School of Mines. I taught courses in general chemistry and quantitative analysis. From 1978 to 1979, I was a senior research chemist with Rockwell International at the Rocky Flats plant. I was responsible for evaluating methods to clean up contaminated soil at Rocky Flats and other Department of Defense facilities. From 1979 to 1983, I was a project supervisor with D'Appolonia Consulting Engineers. In 1983, International Technology (IT) acquired the portion of D'Appolonia for which I worked. At D'Appolonia and IT, I performed many evaluations related to environmental

contamination. In 1985, I joined CDM where I continued to evaluate environmental contamination. I have extensive experience in performing environmental investigations and studies, evaluating the environmental fate and transport of chemicals in the environment and determining the cause or source of contamination in the environment. In all, I have worked on or evaluated environmental conditions at over 500 sites. I am the author or co-author of over 120 publications/presentations and over 400 technical reports relating to environmental contamination.

3. In November 2004, CDM was retained by the Oklahoma Attorney General to perform an investigation concerning environmental contamination found in the Illinois River Watershed ("IRW"). I have been CDM's Project Technical Director since inception of the project. In this capacity, I have helped plan and direct a systematic investigation of the environmental contamination found in the IRW. This investigation included collection and laboratory analyses of poultry waste, soils, surface waters, groundwaters and sediments throughout the IRW.

4. I have reviewed Defendants' Motion To Exclude Expert Testimony Based On Bacterial Analyses Conducted In Violation of EPA, USGS and Oklahoma Standards (And Integrated Brief In Support) submitted May 18, 2009 ("Motion").

5. Field staff that were collecting the samples in the IRW were consistently instructed to make sure the samples arrived at the laboratory as soon as possible. This instruction is consistent with ODEQ and EPA guidance. Field staff were never told to ignore holding times and they were never told that there was a 96 hour hold time for bacteria. In fact, just the opposite was true. Field staff made every attempt to make sure the bacteria samples (and all samples) arrived at the laboratory as soon as possible.

Specifically CDM standard operating procedure (SOP 9-1, Shipping and Chain-of-Custody) states that "samples for bacteria analyses will be shipped overnight on the day they are collected." This SOP was consistently followed in that samples were shipped to laboratory the same day as sample collection.

6. When the field sampling program first started in 2005, procedures and laboratories were selected so that samples could arrive at the laboratory as soon as possible and within recommended guidelines. For bacteria, a local laboratory close to the IRW (FoodProtech in Stillwater, OK) was selected so that samples could arrive at the laboratory the same day of collection. However, the quality of the bacterial analyses at FoodProtech was not acceptable (see Dr. Harwood evaluation in Olsen Expert Report dated May 14, 2008, Appendix A). Therefore another laboratory had to be selected. After a search for acceptable laboratories capable of analyzing all the requested bacteria and interviews with the laboratory director (by Dr. Harwood), Environmental Microbiology Laboratory, Inc. (EML or EMLab) in California was selected to perform the bacterial analyses. At this time, the bacteria holding time was again discussed and the decision was made that shipping overnight (shipping same day of sampling) with analysis setup the same day as sample receipt at the laboratory was acceptable. Again, the field staff were instructed to ship all samples the same day as sample collection via overnight services to the laboratory. This is consistent with instructions in CDM Standard Operating Procedure SOP 9-1. Specific instructions were given to both field staff and EML personnel concerning samples collected on Fridays for Saturday delivery. In these cases, EML (and other laboratories) were notified so that the samples could be received on Saturday at the laboratory so that sample analysis of the bacteria (setup) was started

the same day. Samples were not collected on Saturday or Sunday unless absolutely necessary (e.g., storm runoff conditions).

7. During the first year of sampling in 2005, automatic samplers were installed at selected stream locations in small watershed to collect storm runoff samples (i.e., the high flow stations, HFS). These samples collect water into to 24 bottles over a period of up to 52 hours to obtain samples over the total high flow event (start to finish). After determining the flow conditions throughout the collection process (recorded by the automatic samplers), the samples from the bottles were composited in relative proportions to the flow to create one flow-weighted sample that was sent to the laboratory for analyses. This is a standard procedure for high flow sample collection and processing. The compositing was performed in the CDM laboratory in Denver. Therefore several days could occur between start of sample collection and arrival at the laboratory. At the advice of Dr. Harwood this practice was discontinued for the bacteria samples. Instead when physically possible, grab samples were collected during the high flow event (typically at the highest flow) and sent to the laboratory on the same day of collection. The initial practice resulted in some samples not being shipped to the laboratory on the same day of collection and longer holding times before sample setup and analysis at the laboratory. Even with these initial longer times before laboratory setup, the majority of the HFS samples analyzed for bacteria arrived at the laboratory and were setup in less than 48 hours (see paragraph 14).

8. Similar to high flow samples collected at the automatic samplers, initially various other samples with high suspended solids and high organic content (i.e., storm samples and edge of field samples) required extra time for filtering and sometimes the

field staff could not ship these samples the same day. In some cases, these samples were also shipped to the CDM Denver laboratory for processing because the Denver laboratory had larger and more processing equipment (vacuum pumps, filtration apparatus, etc.). After review of this procedure, field staff were instructed to send samples for bacteria analyses directly to EML from the field on the same day of collection. This is reflected in CDM SOP 10-1, Edge of Field Sampling: "Samples for bacteria will be placed into a sterile bottle and shipped directly to the laboratory. The remaining sample will be processed (filtered and preserved) as appropriate at the CDM laboratory in Denver or the staging facility in Tulsa." Because of shipping to the Denver laboratory for processing, some samples for bacteria analyses had longer times before they were setup and analyzed at EML. In particular some of the field runoff samples (edge of field, EOF) had longer times before setup and analysis.

9. In addition to the shipping samples the same day as collection, samples were always packed in ice in coolers to maintain cold conditions consistent with the recommended guidelines. This practice is consistent with CDM Standard Operating Procedure SOP 9-1, section 2.4.3, Keeping Samples Cold, which provides details on the amounts of ice and packing/shipping details. Field staff were carefully instructed and experienced in the amounts of ice necessary to keep the samples at the recommended temperature (< 8 degree Celsius) before arrival at the laboratory. Furthermore, all laboratories notified CDM if samples did not arrive cold with ice. Samples always arrived at EML in an acceptable state with ice present in the cooler (see Declaration from the EML Regional Laboratory Director, of Dr. K. R. Sambasivam). The presence of ice

means that the temperature of the samples in the coolers and any water (melted ice) surrounding the samples was less than 8 degrees C.

10. During my deposition in September 2008, I could not remember the specific references I had reviewed concerning bacterial holding times. As stated in my deposition, the final decision on bacterial hold times was the decision of Dr. Harwood. I have now found my folder containing the "literature" references discussed in my deposition. This file and the materials in it were produced as part of my considered materials. This file contained the paper Assessment of the Effects of Holding Time and Temperature on *Escherichia coli* Densities in Surface Water Samples (M. L. Pope, et al, 2003, Applied and Environmental Microbiology, Vol 69, No. 10, pp 6201-6207) and bacterial collection, holding, preservation and analyses methods from Standard Methods for the Examination of Water and Wastewater (American Public Health Association, American Water Works Association and Water Environment Federation). The section from Standard Methods concerning Preservation and Storage (9060 B) was approved by the Standard Methods Committee in 2006. Pope et al investigated the affects of various holding times (0, 8, 24, 30 and 48 hours) on bacterial results of *E. Coli*. Pope et al also summarized other studies concerning holding times. These additional studies showed that lower concentrations of bacteria were measured when samples were held up to 30 hours before start of analysis. The Pope et al study also concludes that for sample held at below 10 degrees Celsius, that there were no significant differences in bacterial concentrations between 0 and 48 hours holding times. The Standard Methods makes several recommendations including the following: samples for nonregulatory purposes, do not hold more than 24 hr.; for drinking water compliance coliform E. Coli, the holding

time is 30 hr (at < 8 degree C); for Cryptosporidium the holding time is 96 hr; for nonpotable water for compliance purposes, the maximum transport time is 6 hours with an additional 2 hours in the laboratory before start of processing (setup or prep).

11. Subsequent to my deposition, I have also reviewed additional documents concerning holding times including EPA protocols and Effects of Sample Holding Time on Concentrations of Microorganisms in Water Samples (A. Selvakumar, et al, 2004, Water Environment Research, Vol 76, No. 1, pp 67 -72). In the Selvakumar et al research, samples were held up to 9 days at 4 degrees C before analyses of bacteria. Selvakumar et al also reviewed many other studies and cites two studies where bacterial concentrations decreased with holding times up to 72 hours. One study showed that for "marginally polluted waters", the differences between original concentrations and those at 24, 48 and 72 hours were not significant. One study by Selvakumar et al showed little difference in fecal coliform concentrations between initial analysis and analysis at 168 hours; another study showed little difference in E. Coli concentration between initial sample analysis and analysis at 77.5 hours. Overall, Selvakumar et al concluded that holding times can be extended beyond 24 hours "without affecting data quality".

12. Based upon my review of the documents in my files at the time of deposition, I did not create a "96 hour holding time" for samples collected in the IRW. In my deposition, I was trying to remember the papers I had reviewed and simply stated that if I remembered correctly there was reference to studies or standards with holding times up to 96 hours. In no way was this 96-hours used as an established rule for the IRW. The 96 hour hold time was never discussed with Dr. Harwood or any field staff because this was not the instruction given to the field staff nor was it my understanding of

recommended holding times for bacteria. During my deposition, I was simply trying to remember what I had read in various documents in response to questions. As previously discussed, the field staff were instructed to make sure samples arrived at the specified laboratory as soon as possible with shipping or transportation the same day as collection when physically possible.

13. The Motion to Exclude Expert Testimony Based on Bacterial Analyses is misleading and not accurate concerning the statements about the length of holding times for samples collected in the IRW by CDM and USGS. In particular, Appendix A of the Motion calculates holding times for selected samples. The "Hold Time (Analysis)" is shown to range from 3 to 13 days. This is not an accurate calculation. The holding time should be calculated from sample collection time to analysis setup (or prep) time. The actual analytical methods then required that the bacteria be grown on cultures (incubated) up to 48 hours before the results are "analyzed" (e.g., see Standard Methods procedure 9221 B).

14. Actual evaluation of the sample times from collection in the field to setup or prep time at EML is provided in the attached table:

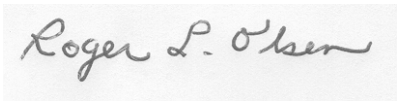
Number of Samples for Each Sample Type

Time (hr)	CDM River	USGS	Tenkiller	Residential Wells	Springs	EOF	HFS
< 24	84	117	12	20	11	3	11
>24 – 30	61	127	14	44	24	11	34
>30 – 48	16	6	7	4	6	14	19
>48	16	1	7	5	0	39	61
Ave hr for > 48	75 hr	69 hr	52 hr	88 hr	--	84 hr	195 hr

Note: 19 of the above samples only had the date of setup recorded. For these samples, the average setup time was used. As shown, most samples were setup within 30 hours. The exception was for the edge of field samples and HFS samples. These two types of samples are previously discussed above. The edge of field samples and HFS samples (ones collected during high flow events) had very high levels of bacteria as reported by EML. However, evaluations based on bacteria concentrations in the edge of field and HFS samples with longer time before setup in the laboratory would therefore be conservative in that the reported concentrations are probably lower than the actual concentrations.

I declare under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct.

Executed on the 5th day of June, 2009.



Roger L. Olsen, Ph.D.